

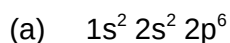
Name of the Student: _____

Max. Marks : 17 Marks

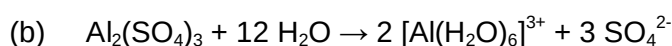
Time : 17 Minutes

Mark Schemes

Q1.

*Allow [He] $2s^2 2p^6$*

1

*Allow $[Al(H_2O)_6]_2(SO_4)_3$*

1

(c) **M1** Al^{3+} has a high charge **and** small size

OR

 Al^{3+} has a high charge density**M2** Al^{3+} weakens the O-H bond (in water ligands and donates H^+ to water or forms H_3O^+ ions with water)***M2** Al^{3+} attracts electrons from the O-H bond (in the ligand and releases H^+ or H_3O^+ ions)*

OR

 Al^{3+} polarises the O-H bond/water molecule

2

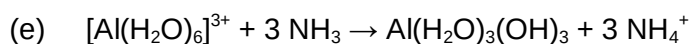
(d) Colourless (solution)

Allow no d-d transitions (as there are no d electrons)

OR

Doesn't absorb visible light

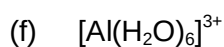
1



White ppt or white solid

*Do **not** accept effervescence**Do **not** accept white ppt dissolves in excess NH_3* *Ignore state symbols*

2



1

(g) A circle around one or more N

A circle around one or more O^-

- (h) M1 n (EDTA⁴⁻) added = 5×10^{-4} mol
alternative methods will be allowed

$$M2 \text{ n (Zn}^{2+}\text{)} = 1.89 \times 10^{-4} \text{ mol}$$

$$M3 \text{ n (EDTA}^{4-}\text{) reacted with the } 25 \text{ cm}^3 \text{ sample of Al}^{3+} = 5 \times 10^{-4} - 1.89 \times 10^{-4} = 3.11 \times 10^{-4} \text{ mol}$$

$$M3 = M1 - M2$$

$$M4 \text{ n EDTA}^{4-} \text{ reacted with the } 250 \text{ cm}^3 \text{ sample of Al}^{3+} = 3.11 \times 10^{-4} \times 10 = 3.11 \times 10^{-3} \text{ mol}$$

$$M4 = \frac{M3 \times 250}{25}$$

$$M5 \text{ n Al}_2(\text{SO}_4)_3 \cdot x\text{H}_2\text{O} = 3.11 \times 10^{-3} \div 2 = 1.555 \times 10^{-3} \text{ mol}$$

$$M5 = M4 \div 2$$

$$M6 \text{ M}_r \text{ Al}_2(\text{SO}_4)_3 \cdot x\text{H}_2\text{O} = 1.036 \div 1.555 \times 10^{-3} = 666.2$$

$$M6 = 1.036 \div M5$$

$$M7 \text{ } 342.3 + 18x = 666(.2) \text{ so } x = 18$$

$$M7 = \frac{M6 - 342.3}{18} \text{ and answer as integer}$$